CLAIMS

1. A method of embedding one or more fibers in a matrix, the method comprising:

forming the one or more fibers using a fiber extruding tool of an apparatus;
arranging the one or more fibers using one or more physical guides and/ or anchors; and
depositing matrix material over the one or more fibers using a matrix material extruding tool of the apparatus, thereby embedding the one or more fibers in the matrix formed from the matrix material,
wherein the matrix material is selected from a group of materials including silicone rubber, fluorosilicone rubber, ethylene-vinyl acetate, silicone polymers, gels, waxes, resins, thermoplastics, clays, or combinations thereof.

2. The method according to claim 1 ,

wherein the one or more physical guides and/or anchors comprise a weave template with a plurality of poles.

3. The method according to claim 2,

wherein a pole of the plurality of poles is used as an anchor point to fix an end of a fiber of the one or more fibers.

4. The method according to claim 2,

wherein a pole of the plurality of poles is used as a nodal point to change a direction of a fiber of the one or more fibers.

5. The method according to any one of claims 2 to 4,

wherein the weave template is formed by fused deposition modelling (FDM).

6. The method according to any one of claims 2 to 5, further comprising:

forming a first mold part defined by a bottom mold before forming the one or more fibers;

wherein the one or more fibers are arranged on the first mold part; and wherein the matrix is a second mold part defined by a top mold so that the one or more fibers are between the first mold part and the second mold part.

7. A method of embedding one or more fibers in a matrix, the method comprising:

forming the one or more fibers using a fiber extruding tool of an apparatus;
arranging the one or more fibers using one or more physical guides and/ or anchors; and
depositing matrix material over the one or more fibers using a matrix material extruding tool of the apparatus, thereby embedding the one or more fibers in the matrix formed from the matrix material,
wherein the matrix material is selected from a group of materials including silicone rubber, fluorosilicone rubber, ethylene-vinyl acetate, silicone polymers, gels, waxes, resins, thermoplastics, clays, or combinations thereof,

wherein the one or more physical guides and/or anchors comprise a sheet template with a plurality of line cuts or holes along one or more edges of the sheet template.

8. The method according to claim 7,

wherein a line cut or hole of the plurality of line cuts or holes is used as an anchor point to fix an end of a fiber of the one or more fibers.

9. The method according to claim 7,

wherein a line cut or hole of the plurality of line cuts or holes is used as a nodal point to change a direction of a fiber of the one or more fibers.

10. The method according to any one of claims 7 to 9,

wherein the plurality of line cuts or holes is formed by using a laser cutter.

11. The method according to claim 1 ,

wherein the one or more physical guides and/or anchors comprise polymer guides printed as a new parts or onto an existing surface or an object .

12. The method according to claim 11,

wherein arranging the one or more fibers comprises layering the one or more fibers between or inside the guides using a needle and/or a co-axial needle.

13. The method according to any one of claims 1 to 12,

wherein depositing the matrix material over the fibers comprises pouring the matrix material over the one or more fibers after arranging the fibers or while arranging the fibers.

14. The method according to any one of claims 1 to 12,

wherein depositing the matrix material over the fibers comprises printing the matrix material layer by layer using direct ink writing (DIW).

15. The method according to any one of claims 1 to 14, further comprising:

heating the matrix material after depositing the matrix material to form the matrix.

16. A setup for embedding one or more fibers in a matrix, the setup comprising:

an apparatus comprising a fiber extruding tool configured to form the one or more fibers; and

one or more physical guides and/or anchors used for arranging the one or more fibers;

wherein the apparatus further comprises a matrix material extruding tool configured to deposit matrix material over the one or more fibers, thereby embedding the one or more fibers in the matrix formed from the matrix material,

wherein the matrix material is selected from a group of materials including silicone rubber, fluorosilicone rubber, ethylene-vinyl acetate, silicone polymers, gels, waxes, resins, thermoplastics, clays, or combinations thereof.

17. The setup according to claim 16, comprising a cutting device configured to cut the fiber after embedding of the one or more fibers, the cutting device being a laser cutter.

18. The method according to any of claims 2 to 5, wherein the one or more physical guides and/ or anchors comprise poles with a spacing between them to allow a needle of the fiber extruding tool and the one or more fibers to pass through.

19. The method according to claim 1, wherein the embedded one or more fibers are held in tension by the one or more physical guides and/ or anchors until the matrix material cures into fiber composite structure.

20. The method according to claim 1, wherein arranging the one or more fibers using one or more physical guides and/ or anchors comprises coiling the one or more fibers around the one or more physical guides and/ or anchors with more than one revolutions.